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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,243	05/31/2001	Gary Ngai	50277-1682	2404

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EXAMINER

THOMAS, SHANE M

ART UNIT	PAPER NUMBER
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2186

DATE MAILED: 07/29/2004

10

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/872,243

Applicant(s)

NGAI ET AL.

Examiner

Shane M Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4-8, 21-24, 27, 31-35 and 48-51 is/are allowed.
- 6) ☒ Claim(s) 1-3, 9-17, 19, 20, 25, 26, 28-30, 36-44, 46, 47, 52 and 53 is/are rejected.
- 7) ☒ Claim(s) 18 and 45 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 May 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

As per Applicant's amendment filed 6 May 2004, the Examiner's rejection of claims 13 and 40 under §112, second paragraph, have been respectfully withdrawn hereto.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

As per Applicant's amendment, filed 6 May 2004, the Examiner's rejection of claims 1-4, 9-19, 21, 22, 25, 26, 28-31, 36-46, 48, 49, 52, and 53 under §102(e), as being anticipated by Beaven et al. (U.S. Patent No. 6,675,321), have been respectfully withdrawn hereto.

Claims 1-3, 9-17, 20, 25, 26, 28-30, 36-44, 47, 52, and 53, are rejected under 35 U.S.C. 102(b) as being anticipated by IBM Technical Disclosure Bulletin (Volume 32, No. 8A) article entitled *Circular Database Log With Dynamic Allocation and Deallocation*, herein IBM.

As per claims 1 and 28,

IBM teaches a circular database log (page 339) to store undo information for removing changes that are made by a plurality of entries that alter a database. The Examiner is considering an --entity-- to be a single transaction to the database; such a transaction creates a log record that

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is stored in the database log. The undo record for the log records are contained in a log file of a plurality of log files (page 338). Usage of the database log's storage space is monitored by the written log records. For example, if the number of written log records eclipses the initial number of active log files, an unallocated log file gets allocated the default number of pages (page 342). Each Log file (or segment) is comprised of N log pages, where a log page is defined to be the smallest unit either read or written to a database file (page 340).

The Database log automatically adjusts the amount of storage dedicated to the circular buffer by adjusting the number of segments in the plurality of segments based on the usage. As stated in the previous example, another segment (log file) is allocated when the current number of active log files is filled with log records (pg 342).

As per claims 2 and 29, each transaction record (entity) is associated with the first sequential segment (log file) that contains a free page (page 341). The log record for that transaction is stored will be stored there.

As per claims 3 and 30, the maximum amount of storage space is defined as the total number of log files (segments). This maximum is represented by T, which is the total number of allocated and unallocated log files (segments) (page 341). Since the database log is a circular buffer, after the last segment is allocated, the next segment to receive a log record is the first segment (page 342). The database log is FULL when the contents of the next log page in the logical circle are still needed (page 341). Thus there is a prevention mechanism that prevents the maximum storage space from being eclipsed.

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As per claims 9 and 36, when the current number of allocated pages is reached (variable A - page 340), a new segment (log file) is allocated from the inactive (variable I) log files in order to accommodate a new entity (transaction's log record). Refer to page 342.

As per claims 10 and 37, IBM states on page 342 that an inactive log is allocated N pages (from 0) when a new segment is required. By definition (page 340) inactive log files are not allocated to any segment [active segment] of the plurality of [active] segments.

As per claims 11 and 38, it can be seen that an inactive log file would not be allocated unless information (log record) for at least one entity (transaction) is stored on every active log file, since a new segment is not allocated unless the currently active log files are full [with transaction log records].

As per claim 12 and 39, the determination if a first log file (segment) of the plurality of log files is not storing undo information for the plurality of entries (transactions) is made by determining if the first log file is an active log file or inactive log file. If the first log file (segment) is inactive, it is by definition capable of being allocated (activated) for storing undo information (log records) for a new transaction. Refer to page 342.

As per claims 13 and 40, IBM states in page 342 that log files are checked to see if the undo information they contain is no longer needed. If not, the log file is truncated to 0 pages and becomes inactive. Thus when a new entity requires additional or initial storage and the number of currently active log files reaches its max (A), the truncated log file can be allocated from the inactive log files for the new entity (refer to page 342).

As per claims 14 and 41, the Examiner is considering an entry to be a transaction that is altering the database and a segment to be that transaction's the respective log record. The log

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records are comprised of one or many log pages (page 341) and store undo information as discussed in the rejection for claims 1 and 28.

A transaction is associated with a segment of the plurality of segments that have been written into the database log as per transactions modifying the database itself. The size of the log record being written (first segment) is increased in size in response to a request from the first entity by allocating an additional amount of storage space (additional log pages) to the first segment. This additional allocation procedure can be found on page 341 of IBM. When a log record (first segment) is about to eclipse the number of free pages on a current log file, additional pages are allocated on the next logical log file so that the log record (first segment) can complete. Thus log records (segments) can span log files, part of the segment existing on log file $L[i]$ and the remainder of the segment on log file $L[i+1]$.

As per claims 15 and 42, it is inherent that if the log record (first segment) is not completed and the number of pages of the current log file is empty (and the maximum of log files has not reached variable T), then additional space will be allocated on the next logical log file, or a new log file will be activated in order to store the remainder of the transaction's log record (undo data). Refer to page 341.

As per claims 16 and 43, it can be seen on page 341 that the amount of storage space that is allocated in the next logical log file would be sufficient to store the remainder of the log record (undo information). However, if the number of active log files has reached its max (variable A = variable T) then it can be seen that the database log is full. One of two possible scenarios would then take place: 1) the database log would stall until a log file could be allocated, or 2) a

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garbage collection - such as the soft checkpoint mentioned on page 342 - would occur in order to allocate a log file to which to store the remainder of the first segment (log record).

As per claims 17 and 44, it can be seen on page 341 that the addition amount (number of pages) of storage space would be based on the storage space currently allocated for the first segment (log record). For example, if a log record needs X number of pages to store undo information and there is only Y available pages remaining on the current log file (Y being less than X), then it can be seen from the teaching on page 341 that the remaining number of pages (X-Y) would be allocated on the next logical log file. Therefore, the number of pages to allocate on the next logical log file is based on the storage space (number of log pages) already in use by the log record (undo information) such that the addition amount of log pages equals the number of recently used pages subtracted from the total needed by the log record.

As per claims 20 and 47, as stated on page 342, if a second segment (log record) is comprised in a log file that is no longer needed by the database log, then the corresponding log file, containing the entity's segment (second segment) can be truncated to become inactive. If another entity (transaction) needs additional storage to store its log record (first segment), then IBM states on page 342, that a truncated, inactive page can be activated. It can then be seen that the recently truncated page that once contained the second segment can now be allocated (activated) in order to store the remainder of the first entity's log record (first segment).

As per claims 25 and 52, the Examiner is defining the total number of log pages that are required to store the remainder of an entity's log record (first segment) to be an --extent-- of contiguous storage space. The contiguous storage space being the contiguous log pages found in

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the next logical log file. Thus, following the example of page 341, the --extent-- would be the set of contiguous log pages contained in the beginning of log file L[i+1].

As per claims 26 and 53, as mentioned above, if a new entity (transaction) needs to store undo information (log record) and the current number of active log files is at a maximum (variable A), then an inactive log file can be allocated from the set of inactive log files (variable I). Periodically, the database log will perform a soft checkpoint to deallocate segments (log files) that are no longer needed (page 342).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Technical Disclosure Bulletin (Volume 32, No. 8A) article entitled *Circular Database Log With Dynamic Allocation and Deallocation*, herein IBM., as applied to claims 1-3, 9-18, 20, 25, 26, 28-30, 36-45, 47, 52, and 53, above.

As per claims 19 and 46, if the number of currently allocated log files was at a maximum (variable A) and an entity (transaction) needed to finish storing its log record in the database log and the current log file had eclipsed its maximum number of available log pages (variable N), , it would have been obvious to one having ordinary skill in the art at the time the invention was made to have seen that an inactive log file of the plurality of inactive log files could have been

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allocated to the store the remained of the entity's log record (first segment). Refer to pages 341-342).

Allowable Subject Matter

Claims 4 and 31 are allowable over the prior art of record.

The following is a statement of reasons for the indication of allowable subject matter:

As per claims 4 and 31, the prior art of record does not teach every claimed limitation listed claims 4 and 31.

Claims 5-8, 21-24, 32-35, and 48-51 are allowable as be dependent on allowable claims 4 and 31, respectively.

Claim 27 is allowed, as mentioned in the previous Office action, dated 2 February 2004.

Claims 18 and 45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As per claims 18 and 45, the prior art of record does not teach selecting an addition amount of storage based on a plurality of predetermined amounts. IBM shows only allocated enough additional log pages on the next logical log file (page 341) to accommodate the remainder of the log record (undo information).

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Remarks

The Examiner would like to point out that the serial number associated with the application found along the top of each page of the Applicant's Amendment filed 6 May 2004 is incorrect. Ser. No. 09/872,932 is incorrect and should be 09/872,243.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shane M Thomas whose telephone number is (703) 605-0725. The examiner can normally be reached on M-F 8:30 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt M Kim can be reached on (703) 305-3821. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Shane M. Thomas



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